Appendix E

Willow Brook Stream Channel and Wetland
Confirmatory Analytical Results
and Data Validation Reports

The following reports are partial reports and do not include the referenced tables
confirmatory analytical results as indicated. This information will be provided
under separate cover upon request.

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 04/01/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/28/02

A Tier II data validation was performed on data for one soil sample collected on March 28, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from a location of the Site designated as WT-CS-12-116. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The sample was submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported this sample under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203B46 (batch 14233).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

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Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperatures upon receipt were 17.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

The sample was shipped to Premier Laboratory under chain of custody on 03/28/02. The laboratory received the sample on 03/28/02. The sample was analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002169. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

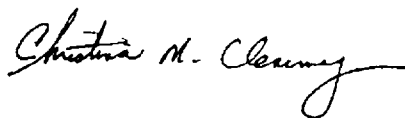A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical

error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/28/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/26/02

A Tier II data validation was performed on data for two soil samples collected on March 26, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-114 through WT-CS-12-115. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203A39 (batch 14195).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

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Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperatures upon receipt were 2°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to

the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/26/02. The laboratory received the samples on 03/26/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002364. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

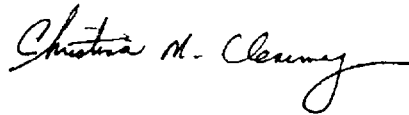A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical

error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/22/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/26/02

A Tier II data validation was performed on data for fifteen soil samples collected on March 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-13-038 through WT-CS-13-043, and WT-CS-12-105 through WT-CS-12-113. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203925 (batch 14115).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

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The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperatures upon receipt were 4.0°C and 5.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient

temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/22/02. The laboratory received the samples on 03/22/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002349. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.
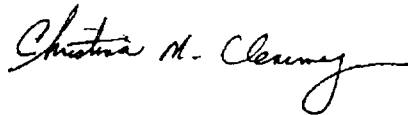
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Cleary

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/28/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/22/02

A Tier II data validation was performed on data for seven soil samples collected on March 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank (2002363) was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E203925.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

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validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration   - Practical Quantitation Limits

- Blanks   - Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on March 22, 2002. The laboratory received the samples on March 22, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory were 4.0°C and 5.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2002363) and the method blank were evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs. No qualifications were made on the unspiked sample.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002353. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses, with the exception of 2-hexanone, 4-methyl-2-pentanone, 1,1,2,2-tetrachloroethane, 2-butanone, dibromochloromethane, and 1,1,2-trichloroethane. Refer to attached validation tables for details of qualification decisions.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory were 4.0°C and 5.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002353. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoroanthene, benzo(g,h,i)perylene, 4-chloroaniline, chrysene, 3,3-dichlorobenzidine, 2,4-dinitrophenol, fluoranthene, hexachloroethane, isophorone, 2-methylnaphthalene, 3- & 4-methylphenols, phenanthrene, pyrene were outside QC % recovery and RPD acceptance limits. Results in the unspiked sample were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control samples.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control

limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2002349. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data were within the QC acceptance criteria for LCS percent recovery (%R), with the exception of Arsenic (30.8%), which was outside the QC acceptance limits (80-120%). All affected data were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Holding Time
- Laboratory Duplicates

- Initial Calibration Verification
- Laboratory Control Sample

- Continuing Calibration Verification   - Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance

criteria were met for continuing calibrations for cyanide.

Blanks

No detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2002349 were within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

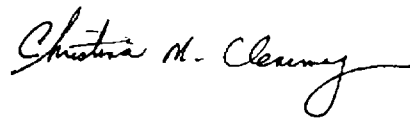All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package

have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some VOC and SVOC data were qualified based on high / low % recovery, and / or high RPD in the MS/MSD results. Arsenic was qualified due to low LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/25/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/21/02

A Tier II data validation was performed on data for three soil samples collected on March 21, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-13-035 through WT-CS-13-037. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203895 (batch 14094).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

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Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/21/02. The laboratory received the samples on 03/21/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2002005. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

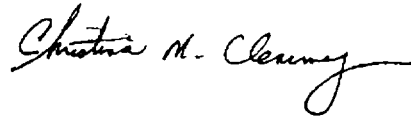A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical

error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/22/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/20/02

A Tier II data validation was performed on data for seven soil samples collected on March 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from the locations of the Site designated as WT-CS-13-029 through WT-CS-13-034. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203808 (batch 14063).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to

the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/20/02. The laboratory received the samples on 03/20/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001998. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

Samples 2001998 / 2001999 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

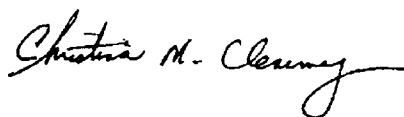| Compound	Sample # 2001998	Duplicate # 2001999	RPD	Action	Affected Samples
Aroclor 1254	780	1500	63%	J	2001998, 2001999

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were not within QC acceptance limits for Aroclor 1254 and were quaified as estimated.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Aroclor 1254 was qualified as estimated due to poor field duplicate precision.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clancy

_____
Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/20/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/26/02

A Tier II data validation was performed on data for four soil samples collected on March 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank (2002004) was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E203808.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

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validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on March 20, 2002. The laboratory received the samples on March 20, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2002004) and the method blank were evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs. No qualifications were made on the unspiked sample.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001998. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

Samples 2001998/ 2001999 were submitted as field duplicate pair. The RPD for 2001998/ 2001999 were not calculated since both results were non-detect.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times, with the exception of Perylene-d12, which was outside the acceptance limits for the IS area count (bias low) for sample 2001998. Refer to attached validation tables for details of qualification decisions.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001998. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoroanthene, chrysene, fluoranthene, phenanthrene, pyrene, carbazole, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were outside QC %

recovery and RPD acceptance limits. Results in the unspiked sample were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control samples.

Field Duplicate

Samples 2001998/ 2001999 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001998	Duplicate # 2001999	RPD	Action	Affected Samples
Acenaphthene	1700	2600	42%	A	2001998, 2001999
Anthracene	600	ND	NC	A	2001998, 2001999
Benzo(a)anthracene	1900	3200	51%	J	2001998, 2001999
Benzo(a)pyrene	1300	3000	79%	J	2001998, 2001999
Benzo(b)fluoranthene	1500	2600	54%	J	2001998, 2001999
Benzo(g,h,i)perylene	490	ND	NC	A	2001998, 2001999
Benzo(k)fluoranthene	1200	3100	88%	J	2001998, 2001999

Chrysene	1900	3500	59%	J	2001998, 2001999
Dibenz(a,h)anthracene	270	ND	NC	A	2001998, 2001999
Fluoranthene	7000	9900	34%	A	2001998, 2001999
Fluorene	1500	ND	NC	A	2001998, 2001999
Indeno(1,2,3-cd)pyrene	500	ND	NC	A	2001998, 2001999
Phenanthrene	2000	5600	95%	J	2001998, 2001999
Pyrene	4700	7100	41%	A	2001998, 2001999
Carbazole	530	ND	NC	A	2001998, 2001999

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for acenaphthene, anthracene, benzo(g,h,i)perylene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, pyrene, and carbazole. All other affected compounds were qualified as estimated.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Matrix Spike

- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV)

for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001998. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses, with the exception of lead, which was outside the QC acceptance limits (126.0% / 127.4%). Results in the unspiked sample were qualified accordingly.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

Samples 2001998/ 2001999 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001998	Duplicate # 2001999	RPD	Action	Affected Samples
Barium	23	29	23%	A	2001998, 2001999
Cadmium	4.2	10	82%	J	2001998, 2001999
Chromium	1000	1200	18%	A	2001998, 2001999
Copper	190	350	59%	J	2001998, 2001999
Lead	69	120	54%	J	2001998, 2001999
Nickel	110	220	67%	J	2001998, 2001999
Silver	3.2	9.7	101%	J	2001998, 2001999
Zinc	23	59	88%	J	2001998, 2001999
Mercury	1.0	2.1	71%	J	2001998, 2001999

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for barium and chromium. All other affected compounds were qualified as estimated.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data were within the QC acceptance criteria for LCS percent recovery (%R), with the exception of Arsenic (57.2%), and Selenium (125.3%), which were outside the QC acceptance limits (80-120%). All affected data were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance criteria were met for continuing calibrations for cyanide.

Blanks

No detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2001998 and were within QC acceptance limits for cyanide. TPH was outside the QC acceptance limits (457% / 427%) for MS/MSD % recovery. Results in the unspiked sample were qualified accordingly.

Field Duplicate

Samples 2001998/ 2001999 were submitted as field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001998	Duplicate # 2001999	RPD	Action	Affected Samples
TPH	1600	3300	69%	J	2001998, 2001999
Cyanide	0.88	1.0	NC	A	2001998, 2001999

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for cyanide. TPH was qualified as estimated.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.
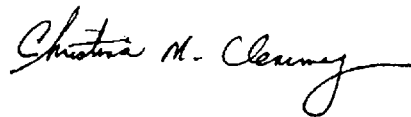
Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some SVOC data were qualified based on high / low % recovery, and / or high RPD in the MS/MSD results. Some SVOC data were qualified based on low Internal Standard Area count, and / or poor field duplicate precision. Some metals were qualified due to poor field duplicate precision. Arsenic was qualified due to low LCS % recovery, and Lead was qualified based on high MS/SMD % recovery. TPH was qualified due to poor field duplicate precision, and high MS/SMD % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/22/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/20/02

A Tier II data validation was performed on data for seven soil samples collected on March 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from the locations of the Site designated as WT-CS-13-029 through WT-CS-13-034. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203808 (batch 14063).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

● Page 1

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to

the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/20/02. The laboratory received the samples on 03/20/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001998. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

Samples 2001998 / 2001999 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

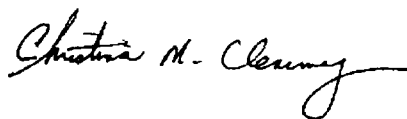| Compound	Sample # 2001998	Duplicate # 2001999	RPD	Action	Affected Samples
Aroclor 1254	780	1500	63%	J	2001998, 2001999

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were not within QC acceptance limits for Aroclor 1254 and were quaified as estimated.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Aroclor 1254 was qualified as estimated due to poor field duplicate precision.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clenny

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/20/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/20/02

A Tier II data validation was performed on data for five soil samples collected on March 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-103 through WT-CS-12-104, WT CS-13-027 through WT-CS-13-028 and WT-CS-15-001. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203682 (batch 14016).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed

in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/14/02. The laboratory received the samples on 03/14/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001991. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.
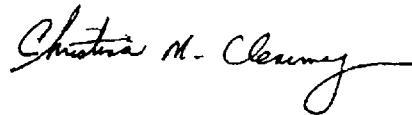
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/22/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/18/02

A Tier II data validation was performed on data for one soil sample collected on March 18, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank (2001995) was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E203682.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Practical Quantitation Limits

- Blanks
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on March 18, 2002. The laboratory received the samples on March 18, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001995) and the method blank were evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs, with the exception of Bromofluorobenzene, which was outside the acceptance limits (89-106%) for 2001991MS (108%). No qualifications were made on the unspiked sample.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine

laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001991. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are

submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error .

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds .

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001991. Bis(2-chloroisopropyl)ether and phenol were outside acceptance limits (high RPD). Results in the unspiked sample were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control samples.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike

- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001991. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses, with the exception of mercury, which was outside the QC acceptance limits (137.4%). However, since the non-spiked sample had a non-detect result, no qualifications were necessary.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data were within the QC acceptance criteria for LCS percent recovery (%R), with the exception of Silver (78.3%), Arsenic (57.4%), and Selenuim 9127.3%), which were outside the QC acceptance limits (80-120%). All affected data were qualified accordingly.

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample

- Continuing Calibration Verification   ■ Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance

criteria were met for continuing calibrations for cyanide.

Blanks

No detects were reported in the associated method blanks for TPH and cyanide.. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed.on sample 2001991 and were within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

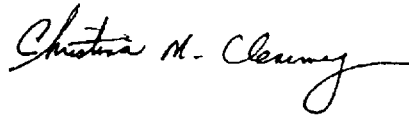All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package

have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some SVOC data were qualified based on high RPD in the MS/MSD results. Some metals were qualified due to low LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/20/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/19/02

A Tier II data validation was performed on data for one soil sample collected on March 19, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The sample was collected from location of the Site designated as WT-CS-15-002. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203748 (batch 14039).

The sample results were assessed according to <u>Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses</u>: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.9°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/19/02. The laboratory received the samples on 03/19/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001996. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS sample.

Field Duplicate

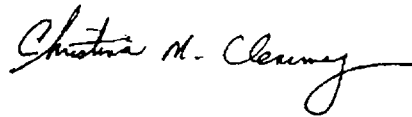A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical

error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clemay

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/19/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/14/02

A Tier II data validation was performed on data for eight soil samples collected on March 14, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-13-019 through WT-CS-13-026. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203563 (batch 13980).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

● Page 1

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 11°C - 12.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/14/02. The laboratory received the samples on 03/14/02. The samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are

assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs with the exception of sample 2001981. One surrogate spike was outside quality control limits for decachlorobiphenyl. The surrogate was above the acceptance range for both columns. The results were estimated and may be biased high.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001982. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
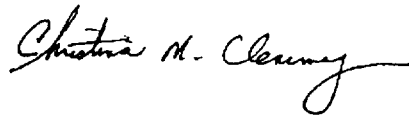
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some data qualified were qualified based on high surrogate recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/25/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/14/02

A Tier II data validation was performed on data for four soil samples collected on March 14, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank (2001989) was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E203563.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on March 14, 2002. The laboratory received the samples on March 14, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was $11.0^{\circ}C - 12.0^{\circ}C$. The

QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001989) and the method blank were evaluated for contamination for

VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are
assessed by evaluating surrogate recovery. Poor surrogate recovery can be
an indication of interfering matrix effects, presence of high concentration
target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by
assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine
laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001982. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 11.0°C – 12.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified

based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of hexachlorocyclopentadiene, which was qualified as estimated due to high continuing calibration drift (29%). Refer to attached validation tables for details of qualification decisions.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times, with the exception of chrysene-d12 and perylene-d12, which were outside the IS area counts acceptance limits. Refer to attached validation tables for details of qualification decisions.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001982. 2,4-dinitrophenol; 2-methyl-4,6-dinitrophenol; pyrene, 4-nitrophenol; and fluoranthene were outside acceptance limits. Results in the unspiked sample were qualified accordingly. Refer to attached validation tables for details of qualification decisions.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control samples.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified

blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001982. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses, with the exception of barium, cadmium, and mercury. Refer to attached validation tables for details of qualification decisions.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data were within the QC acceptance criteria for LCS percent recovery (%R)

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike
- Agreement with Chain of Custody
- Field Duplicates
- Preservation and Holding Time
- Laboratory Duplicates
- Initial Calibration Verification
- Laboratory Control Sample
- Continuing Calibration Verification
- Detection Limit Results
- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory

performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance criteria were met for continuing calibrations for cyanide.

Blanks

No detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2001982 and were within QC acceptance

limits for cyanide. TPH data was qualified due to low MS/MSD % recovery (<10%). Refer to attached validation tables for details of qualification decisions.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

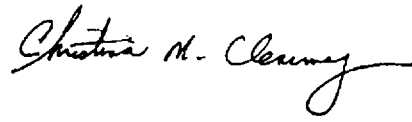All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some SVOC data were qualified based on high / low % recovery and high RPD in the MS/MSD results. Some SVOC data were qualified due to high continuing calibration drift, and low internal standard area counts. Some metal and TPH data were qualified based on high / low % recovery in the MS/MSD results.

To the best of my knowledge, after thorough review of the attached sampling data and

validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/14/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/12/02

A Tier II data validation was performed on data for six soil samples collected on March 12, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-096 through WT-CS-12-102. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E203433 (batch 13937).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

<u>PCB ANALYSES</u>

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Samples were shipped to Premier Laboratory under chain of custody on 03/12/02. The laboratory received the samples on 03/1202. Six of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001972. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
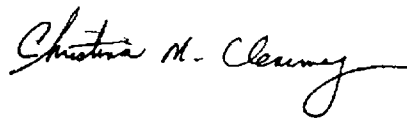
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/20/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 03/12/02

A Tier II data validation was performed on data for four soil samples collected on March 12, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank (2001980) was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report. One sample (2001970) was analyzed for SVOCs, SPLP only.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E203433.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other

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parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check

- Laboratory Control Sample

- Initial and Continuing Calibration

- Practical Quantitation Limits

- Blanks

- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on March 12, 2002. The laboratory received the samples on March 12, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 9.0 °C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001980) and the method blank were evaluated for contamination for

VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001972. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 9.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified

based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001972. Di-n-butyl phthalate and fluoranthene were reported with a high RPD. All affected data were qualified as estimated in the unspiked sample. A matrix spike analysis was performed for sample 2001970for SVOC, SPLP. All QC acceptance criteria were met for %R and RPD. It should be noted that a MSD was not analyzed for SPLP due to insufficient volume.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control samples.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified

blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001972. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data were within the QC acceptance criteria for LCS percent recovery (%R)

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and Cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Holding Time
- Laboratory Duplicates

- Initial Calibration Verification
- Laboratory Control Sample

- Continuing Calibration Verification
- Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory

performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance criteria were met for continuing calibrations for cyanide.

Blanks

No detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2001972 and were within QC acceptance

limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.
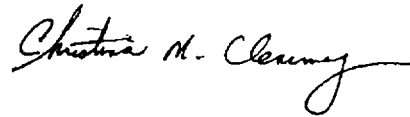
Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Some SVOC data were qualified based on high RPD in the MS/MSD results.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/5/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/28/02

A Tier II data validation was performed on data for six soil samples collected on February 28, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-091 through WT-CS-12-096. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202A54 (batch 13715).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Seven samples were shipped to Premier Laboratory under chain of custody on 02/28/02. The laboratory received the samples on 02/28/02. Six of these samples were analyzed for PCBs by SW846 Method 8082. The seventh sample was a trip blank and was analyzed with the "other" parameters. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001964. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
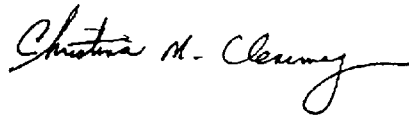
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/06/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/28/02

A Tier II data validation was performed on data for three soil samples collected on February 28, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202A54.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

● Page 1

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks
- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 28, 2002. The laboratory received the samples on February 28, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.0 °C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001969) and the method blank were evaluated for contamination for

VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001964. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified

based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of hexachlorocyclopentadiene for SPLP, which was outside the continuing calibration drift acceptance criteria (32.3%). All affected data were qualified as estimated.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001964. Benzo[g,h,i]perylene and dibenz[a,h]anthracene were reported with a high percent recovery in the MS and MSD analyses, and hexachlorocyclopentadiene was reported with a high RPD%). All affected data were qualified as estimated.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001964. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for LCS percent recovery (%R) criteria with the exception of selenium (131.6%), silver (122.5%), and arsenic (59.6%), which were outside the acceptance criteria (80-120%). %). All affected data were qualified as estimated for arsenic. No detects were reported in the associated samples for silver

and selenium. The non-detects were accepted as reported.

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Holding Time
- Laboratory Duplicates

- Initial Calibration Verification
- Laboratory Control Sample

- Continuing Calibration Verification
- Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance criteria were met for continuing calibrations for cyanide.

Blanks

No positive detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2001964 and were within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.
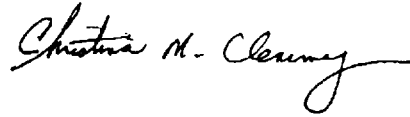
Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Hexachlorocyclopentadiene was qualified as estimated due to high continuing calibration drift and high MS/MSD % recovery. Arsenic was qualified as estimated due to low % recovery in the LCS analyses.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina M. Cleary

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/4/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/26/02

A Tier II data validation was performed on data for six soil samples collected on February 26, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-085 through WT-CS-12-090. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202947 (batch 13662).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

● Page 1

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001957) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0202-02-04.6. Aroclor 1254 was spiked into the sample at a concentration of 5.19 ug/l. The performance acceptance limit was 2.66-6.85 ug/l. The laboratory reported a concentration of 5.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/-2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Thirteen samples were shipped to Premier Laboratory under chain of custody on 02/26/02. Seven of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001951. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
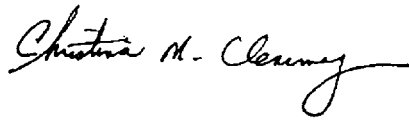
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/06/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/26/02

A Tier II data validation was performed on data for three soil samples collected on February 26, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202947.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

● Page 1

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 26, 2002. The laboratory received the samples on February 26, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was submitted for VOCs as sample number 2001962. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis. Nineteen VOCs were spiked into the sample. Trichloroethylene was reported (44 ug/L) above the acceptance limit (26.2 – 41.1 ug/L). No detects were reported for trichloroethylene in the associated samples. All non-detects were accepted based on high % recovery.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation

techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 9.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and

to subsequently assess their contribution to measurement error

A trip blank (2001956) and the method blank were evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs with the exception of one surrogate (Toluene-d8) for the MSD analysis for sample 2001951. Toluene-d8 was slightly below the acceptance limit. Since all surrogates were in for the unspiked sample (2001951) and the MS analyses, no qualification was applied to the unspiked sample based on surrogate recovery.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001951. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was submitted for SVOCs as sample 2001960. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis. Forty-one SVOC compounds were spiked into the performance sample, which

was prepared by Environmental Resource Associates of Arvada, Colorado. All forty-one compounds were within QC acceptance limits.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 9.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of hexachlorocyclopentadiene for SPLP, which was outside the continuing calibration drift acceptance criteria (33%). All affected data were qualified as estimated.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

The method blank was evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001951. Benzo[g,h,i]perylene and dibenz[a,h]anthracene were reported with a high percent recovery in the MS and MSD analyses. These compounds were not detected in the unspiked sample; therefore, no qualification was applied to the non-detected results based on high % recovery.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike

- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was submitted for Metals as sample number 2001958. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis. Eleven metals were spiked into the performance sample, which was prepared by Environmental Resource Associates of Arvada, Colorado. All eleven metals were within acceptance limits.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control

limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001951. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for LCS percent recovery (%R) criteria with the exception of selenium. Selenium was reported with a high % recovery in the LCS. No detects were reported in the associated samples. The non-detects were accepted as reported.

ICP Interference Check Sample

All results were within QC acceptance limits for % recovery for the ICP Interference Check sample.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample

- Continuing Calibration Verification
- Detection Limit Results

- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was submitted for TPH as sample number 2001961. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis. The TPH result was reported above the acceptance limit. TPH was not detected in any of the associated samples. No qualification is applied to non-detect results based on high % recovery.

A performance sample was submitted for Cyanide as sample 2001959. The reported result was within the QC acceptance limit.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibrations were analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve for TPH was greater than 0.9950. The %RSD was less than 20%. All initial calibration QC acceptance criteria were met for

Cyanide.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %D was below 15% for the continuing calibration analyses for TPH. All QC acceptance criteria were met for continuing calibrations for cyanide.

Blanks

No positive detects were reported in the associated method blanks for TPH and cyanide. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was performed on sample 2001951 and were within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.
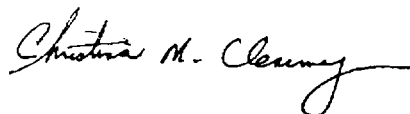
Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Hexachlorocyclopentadiene was qualified as estimated due to high continuing calibration drift and high MS/MSD % recovery. Benzo[g,h,i]perylene and dibenz[a,h]anthracene were reported with a high % recovery in the MS/MSD analyses and selenium was reported with a high % recovery in the LCS analyses. No detects were reported for these compounds. Qualification was not applied to the non-detected results based on high % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/4/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/22/02

A Tier II data validation was performed on data for four soil samples collected on February 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-081 through WT-CS-12-084. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to **Premier Laboratory, LLC** in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202826 (batch 13586).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

<u>PCB ANALYSES</u>

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001949) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0218-02-01.7. Aroclor 1254 was spiked into the sample at a concentration of 8.65 ug/l. The performance acceptance limit was 4.43-11.4 ug/l. The laboratory reported a concentration of 6.2 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Six samples were shipped to Premier Laboratory under chain of custody on 02/22/02. Five of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001945. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
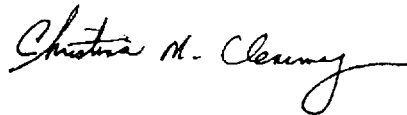
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clancy

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 03/04/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/22/02

A Tier II data validation was performed on data for two soil samples collected on February 22, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202826.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 22, 2002. The laboratory received the samples on February 22, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0 °C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001949) all method blanks were evaluated for contamination for VOCs.

No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001945. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 6.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified

based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of hexachlorocyclopentadiene, which was outside the continuing calibration drift acceptance criteria (33%). All affected data were qualified as estimated.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001945. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Technical Holding Times
- Laboratory Duplicates

- Furnace AA / Post Digestion Spike

- Calibration Verification
- Laboratory Control Sample

- Blanks
- Serial Dilution Results

- ICP Interference Check Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on

laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001945. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Barium	63.8	64.2	75-125		J	J	Low	2001945
Zinc	74.9	74.1	75-125		J	J	Low	2001945

All affected data were qualified accordingly.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for LCS percent recovery (%R) criteria.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike
- Agreement with Chain of Custody
- Field Duplicates
- Preservation and Holding Time
- Laboratory Duplicates
- Initial Calibration Verification
- Laboratory Control Sample
- Continuing Calibration Verification
- Detection Limit Results
- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.
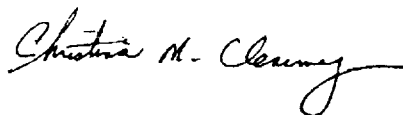
Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Hexachlorocyclopentadiene was qualified as estimated due to high continuing calibration drift and high MS/MSD % recovery. Barium and zinc were qualified due to low LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina M. Clancy

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/25/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/20/02

A Tier II data validation was performed on data for five soil samples collected on February 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-077 through WT-CS-12-080. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202706 (batch 13519).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample was not submitted with this data set.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, which was not technically within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The

trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Six samples were shipped to Premier Laboratory under chain of custody on 02/20/02. Six of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be

an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001931. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

Field Duplicate

Samples 200190 and 2001931 were submitted as a field duplicate pair. The RPD was not calculated since the results for both samples were non-detect.
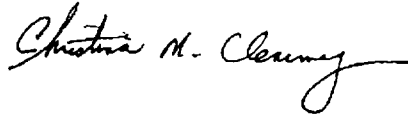
OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical

error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Christine M. Clooney

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/28/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/20/02

A Tier II data validation was performed on data for two soil samples collected on February 20, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202706.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 20, 2002. The laboratory received the samples on February 20, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.0 °C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001935) all method blanks were evaluated for contamination for VOCs.

No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001932. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane		44	46-188		J	J	Low	2001932

All affected data were qualified accordingly.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperature recorded by the laboratory was 7.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of hexachlorocyclopentadiene, which was outside the continuing calibration drift acceptance criteria (33%). All affected data were qualified as estimated.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001932. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Hexachlorocyclopentadiene	96	87	0-81		J	A	High	2001932

All affected data were qualified accordingly.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001932. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for percent recovery (%R) criteria, with the exception of silver (123.5%), and arsenic (50.3%), which were outside the acceptance criteria (80-120%). All affected data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance

criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

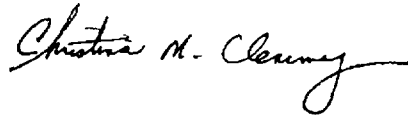All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was estimated due to low matrix spike duplicate % recovery. Hexachlorocyclopentadiene was qualified as estimated due to high continuing

calibration drift and high MS/MSD % recovery. Arsenic was qualified due to low LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Christina N. Clancy

. Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/25/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/19/02

A Tier II data validation was performed on data for sixteen soil samples collected on February 19, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-059 through WT-CS-12-073, and WT-CS-12-076. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202647 (batch 13484).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001924) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 802-02-01.6. Aroclor 1254 was spiked into the sample at a concentration of 2.14 ug/l. The performance acceptance limit was 1.10-2.82 ug/l. The laboratory reported a concentration of 2.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Twenty-five samples were shipped to Premier Laboratory under chain of custody on 02/19/02. Seventeen of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001906. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
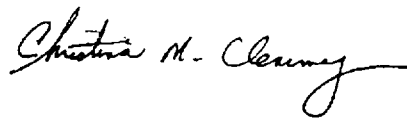
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/27/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/19/02

A Tier II data validation was performed on data for nine soil samples collected on February 19, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202647.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

● Page 1

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 19, 2002. The laboratory received the samples on February 19 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A double blind aqueous performance sample (PE) was prepared by Environmental Resource Associates of Arvada, Colorado. The lot number associated with the VOC PE sample was 0520-02-06.2. Seventeen VOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits with the exception of 1,1,1-trichloroethane, which was reported above the upper acceptance limit. Since no detects were reported for 1,1,1-trichloroethane in the associated samples, all non-detects were accepted without qualification based on high % recovery for the PE results.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory was 6.0 °C and 10°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the samples were collected at ambient temperature, place in a cooler on ice and relinquished to the courier within a single day. The trip from the Site to the laboratory was generally accomplished within one hour. It should also be noted that all VOC soil samples were preserved on Site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations with the exception of acrolein, which was reporte with a low mean relative response factor (<0.05) in both the initial and continuing calibrations. All acrolein results were rejected (R). No detects were reported for acrolein in the

associated samples.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001923) all method blanks were evaluated for contamination for VOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001906. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane		43	46-188		J	J	Low	2001906

All affected data were qualified accordingly.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Forty SVOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits, with the exception of bis(2-chloroethoxy)methane, which was outside the acceptance range (bias low). All affected data was qualified as estimated.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory was 6.0 °C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times, with the exception of samples 2001906MS and 2001906MSD, which were outside (bias high) for numerous internal standard area counts. All affected data were qualified accordingly.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001906. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses..

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates

- Preservation and Technical Holding Times
- Laboratory Duplicates

- Furnace AA / Post Digestion Spike

- Calibration Verification
- Laboratory Control Sample

- Blanks
- Serial Dilution Results

- ICP Interference Check Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

Eleven metals were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding

times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001906. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than

35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for percent recovery (%R) criteria, with the exception of Arsenic (127.3%), which was outside the acceptance criteria (80-120%). All affected data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Matrix Spike

- Agreement with Chain of Custody
- Field Duplicates
- Preservation and Holding Time
- Laboratory Duplicates
- Initial Calibration Verification
- Laboratory Control Sample
- Continuing Calibration Verification
- Detection Limit Results
- Blanks

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

All PE data for TPH and cyanide were within the vendor-certified acceptance limits.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

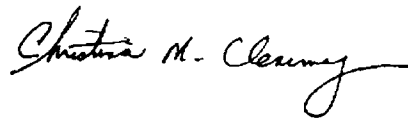All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine

"total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Chloroethane was estimated due to low matrix spike duplicate % recovery. Bis(2-chloroethoxy)methane was qualified as estimated due to poor PE data.. Arsenic was qualified due to high LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/20/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/15/02

A Tier II data validation was performed on data for six soil samples collected on February 15, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-051 through WT-CS-12-056. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202576 (batch 13436).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001904) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0211-02-02.6a. Aroclor 1254 was spiked into the sample at a concentration of 2.34 ug/l. The performance acceptance limit was 1.20-3.09 ug/l. The laboratory reported a concentration of 2.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperatures upon receipt were 5.0°C and 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Ten samples were shipped to Premier Laboratory under chain of custody on 02/15/02. Seven of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001896. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
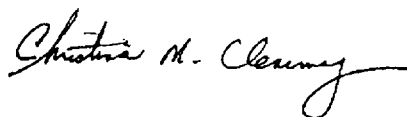
Field Duplicate

A field duplicate pair was not submitted with this data set.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/26/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/15/02

A Tier II data validation was performed on data for five soil samples collected on February 15, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202576.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

● Page 1

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table II of this report.

ORGANIC DATA REVIEW

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds

- Agreement with Chain-of-Custody
- Internal Standards

- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate

- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Blanks

- Practical Quantitation Limits
- Tentatively Identified compounds

DISCUSSION

Agreement of Analyses with Chain of Custody

Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 15, 2002. The laboratory received the samples on February 15, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted..

VOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory were 5.0 °C and 9.0°C.

The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

A trip blank (2001903) all method blanks were evaluated for contamination for VOCs.

No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001896. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the

laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

SEMIVOLATILE ORGANIC ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.

The sample cooler temperatures recorded by the laboratory were 5.0 °C and 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not

qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

GC/MS Instrument Performance Check

Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

Initial and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

Internal Standards

Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001896. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

Field Duplicate

A field duplicate pair was not submitted with this data set.

Tentatively Identified Compounds

No tentatively identified compounds were reported.

INORGANIC DATA REVIEW

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

Calibration Verification

Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

Lab Fortified Blanks

Blank analyses were assessed to determine the existence and magnitude of contamination problems.

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

Matrix Spike / Matrix Spike Duplicate

The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.

A MS/MSD was performed on sample 2001896. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and

MSD analyses.

Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

Field Duplicates

Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).

A field duplicate pair was not submitted with this data set.

Laboratory Control Sample

The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.

All data met the QC acceptance criteria for percent recovery (%R) criteria; with the exception of Silver (79.3%), Lead (142.5%), Selenium (125.2%), and Mercury (144.8%), which were outside the acceptance criteria (80-120%). All affected data were qualified accordingly.

GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method

by which they were analyzed.

REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks

- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

DISCUSSION

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

Blanks

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

Matrix Spike

The MS / MSD was within QC acceptance limits for TPH and cyanide.

Field Duplicate

A field duplicate pair was not submitted with this data set.

Laboratory Duplicate

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

Laboratory Control Sample

All QC acceptance criteria were met for LCS for TPH and cyanide.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

Silver and lead were estimated due to low/high LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative

To: Brian Cutler / LEA
From: Tina Clemmey / LEA
DV Report Date: 02/18/02

Project Name: Willow Brook Pond PCB Remediation
Sampled Date: 02/14/02

A Tier II data validation was performed on data for eleven soil samples collected on February 14, 2002 and an aqueous performance sample for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-039 through WT-CS-12-048. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202511 (batch 13396).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

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The following tables have been included in this report: Table 1: Tier II Data Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

SAMPLES

Samples included in this review are listed in Table 2 of this report.

PCB ANALYSES

Performance Evaluation Data

Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.

A double blind aqueous performance evaluation sample (2001889) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0211-02-02.7. Aroclor 1254 was spiked into the sample at a concentration of 6.11 ug/l. The performance acceptance limit was 3.13-8.07 ug/l. The laboratory reported a concentration of 5.7 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

Preservation and technical holding times

The validity of the analytical results is evaluated based on the preservation

techniques used and the holding time of the sample, as appropriate.

The samples were extracted and analyzed within acceptable holding time. The sample temperatures upon receipt were 6.0°C and 8.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

Agreement with the Chain of Custody

Twenty samples were shipped to Premier Laboratory under chain of custody on 02/07/02. Twelve of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

Initial Calibration and Continuing Calibration

Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.

Initial calibration curves were performed on GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

Blanks

Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error

No detects were reported in the method blank.

Surrogate Compounds

Sample matrix effects and laboratory performance on individual samples are
assessed by evaluating surrogate recovery. Poor surrogate recovery can be
an indication of Interfering matrix effects, presence of high concentration
target and/or non-target analytes, and poor laboratory performance.

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every
sample. QC acceptance criteria was met for percent recovery (%R) for both
surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

Matrix Spike / Matrix Spike Duplicate Analyses

Data for matrix spike / matrix spike duplicates were evaluated to determine
laboratory precision and method bias for specific sample matrices.

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD)
analyses on LEA soil sample 2001876. Aroclor 1254 was spiked into the MS and
MSD samples. Percent recovery and relative percent difference were within
acceptance limits. All data were accepted as reported in the unspiked sample.

Laboratory Control Sample

Laboratory control samples are evaluated to assess the internal quality control of the
laboratory's analytical method accuracy and method bias.

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.
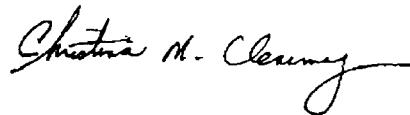
Field Duplicate

Samples 2001884 / 2001885 were submitted as field duplicate pair. The RPD for 2001884 / 2001885 were not calculated since both results were non-detect.

OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the "analytical error" and any "sampling error" associated with the data. The sum of the "analytical error" and the "sampling error" equals the "measurement error." The end user should use the "measurement error" in conjunction with sampling variability to determine "total error" (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant "total error" of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

Authorized Pratt & Whitney Representative